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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
JOHNSTON, PHILLIP A

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/764,457	UTO ET AL.	
	Examiner	Art Unit	
	Phillip A Johnston	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-12,15,16 and 18-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1,2 and 4-11* is/are allowed.

6)☒ Claim(s) *12,15,16 and 18-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Action

Examiners Response to Arguments

1. Applicants arguments are moot in view of new grounds for rejection.

2. Claims 1-11, are allowed because prior art fails to show a defect inspection apparatus that utilizes a laser ray source as defined in Claim 1.

Claims Rejection – 35 U.S.C. 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,411,377 to Noguchi(377), in view of Kokuchi, U.S. Patent No. 5,832,009.

Noguchi (377) discloses in Figure 3, an optical apparatus for defect detection that includes a stage unit 300 comprising a substrate mounting base 304, x, y and z stages

301, 302 and 303 and a stage controller 305; 3 illumination optical systems 100 having a laser-beam source 101, a beam splitter comprising a concave lens 102 and a convex lens 103 and an illumination lens 104 having a conical surface; a detection optical system 200 including a detection lens 201, a spatial filter 202, an image formation lens 203, an ND (Neutral Density) filter 207, a beam splitter 204, a polarization device 208 and one-dimensional detectors (image sensors) 205 and 206 which are each implemented typically by a TDI image sensor; an image-signal processing unit 400. The illumination optical systems 100 has light emitted by the laser-beam source 101, being converted into slit-shaped beams 3 which are radiated to a wafer 1 or an inspected substrate 1 mounted on the substrate mounting base 304 from 3 directions 10, 11 and 12 on a plane. See Column 14, line 47-59, and Column 15, line 27-34. In addition, the laser-beam source 101, may be a high-output YAG laser SHG for generating a second harmonic wave with a wavelength of 532 nm, which is a DUV (deep ultraviolet) laser source, as noted in Column 17, line 41-45, and Column 34, line 21.

Noguchi (377) further discloses that the invention provides an image-signal processing unit 400 characterized in that a variation (a standard deviation) among chips is computed for each pixel in the chip and used for setting a threshold value, and a defect such as a foreign particle in an area with a small variation is detected by using a small threshold value while a defect such as a foreign particle in an area with a big variation is detected by using a large threshold value. In this way, the threshold value for an area with a small variation can be reduced without being affected by an area

with a big variation. An example of an area with a small variation is the memory-cell area in the case of a memory LSI. As a result, it is possible to detect an infinitesimal foreign particle with a size not exceeding 0.1um. See Column 35, line 35-48.

Kikuchi (009) discloses an ultraviolet laser apparatus that includes an optic resonator and a coherence reduction optical system, recited in Claims 2 and 17, respectively. As described in column 9, line 48-58, and column 12, line 50-55, Kikuchi (009), discloses a laser light generating device where the phase-modulated laser beam is converted by wavelength conversion means into a laser beam of a shorter wavelength at the same time as it is further enlarged in spectral width. The result is that the coherence distance of the laser beam is shortened to suppress the speckle noise. In this case, the post-wavelength-conversion laser light is phase-modulated since the resonant frequency of a resonator inclusive of a non-linear optical crystal is coincident with the frequency of the fundamental wavelength laser light beam, wavelength conversion is performed with a high conversion efficiency. The phase modulation, is performed by phase modulation units 54, and wavelength-converted by second harmonics generating units 55 to form second harmonics for widening the spectral width. That is, temporal coherence is lowered. The generated second harmonics are then modulated by image signals by intensity modulation unit 56. Subsequently, the lowering in temporal coherence is converted into that in spatial coherence for reducing the speckle noise in the laser beam.

It would have been obvious to one of ordinary skill in the art that Noguchis'(377) defect inspection apparatus can be modified to use the laser light generating means in

accordance with the teaching of Kokuchi (009) to reduce speckle. Thereby reducing the systems susceptibility to noise produced by the interference pattern, resulting in improved foreign particle detect-ability.

Conclusion

4. The Amendment filed on 6-27-2003 has been considered but the arguments are moot in view of new grounds for rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip A Johnston whose telephone number is 305 7022. The examiner can normally be reached on 7:30 to 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703 308 4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final Communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

PJ

August 29, 2003

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800